

Best rep for tsunamis: Avoid ignorance, heed warning signs

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Make no mistake. Once a tsunami has formed, it cannot be stopped. But those in charge of keeping communities safe when one strikes should listen to experts' warning signs and take the necessary precautions to prevent an already disastrous situation from escalating.

That's according to Northwestern University tsunami expert Emile A. Okal. He will discuss "The Perils of Insularity When Studying Natural Hazards" at the American Association for the Advancement of Science (AAAS) annual meeting in Washington, D.C., Feb. 13, 2016.

"The people at this border of science and society have a restricted, personal and primitive view of things without opening up to what a broader community may teach them," Okal said leading up to the presentation. "In kind words, we call this 'insularism.' It means shielding yourself from what you don't want to hear. But 'insularity' to some might be seen as 'negligence' to others."

In his presentation, Okal will discuss the events and warning signs leading up to disasters such as the 2010 Deepwater Horizon oil spill in the Gulf of Mexico and the 2011 Fukushima Daiichi Nuclear Power Plant accident in Japan.

"With Fukushima, the managers' view of the plant was that it was safe as it had been built, and they dismissed any contrary remarks from scientists who looked at things differently," said Okal, a seismologist and professor of Earth and planetary sciences in Northwestern's Weinberg

College of Arts and Sciences.

But there's a positive side to previous natural disasters, Okal said. They've at least educated the population at large who had never heard of tsunamis before the 2004 Sumatra-Andaman tsunami, which killed more than 225,000 people, including thousands of tourists.

"Warning procedures have improved, and the response of people has been more reasonable and predictable," he said. "Essentially, since 2004, only three people have been killed by a tsunami originating more than 1,000 kilometers away. That's very positive."

Okal published a study last September in which he reviewed the Fukushima event and 16 other significant tsunamis since then. He used the concept of a "wisdom index" to grade the performance of scientists, decision-makers and populations at risk. The index was based on the warning issued (or not) during the event and on the response of the population.

Okal found mixed results as to how much wiser people have become about these natural events and how to reduce their impact.

In addition to the mixed "wisdom indices," the key results of Okal's study are:

- Education is important. "One thing is clear, saving human lives is easier when individuals are educated to the risks in question," he said. "Education, in all its forms—formal, classroom, drills, ancestral—works."
- Substantial progress has been made in terms of controlling tsunami hazard in the "far field" (a tsunami that originates from a source greater than 1,000 kilometers, or 620 miles, away). Only a

handful of deaths have occurred in far field tsunamis since the 2004 Sumatra tsunami.

- The major challenge remains the so-called "tsunami earthquakes," events not strong enough to alarm the population at risk, yet with considerable [tsunami](#) potential.
- Some paradigms which led scientists to think that mega-earthquakes occur only in certain geological environments—featuring young and fast tectonic plates—had to be revised or abandoned. "For lack of a better understanding, scientists must now assume that mega-earthquakes may occur at any subduction zone," Okal said. (A [subduction zone](#) is where one tectonic plate sinks below another.)

His presentation is part of the symposium "Tsunamis: An International Hazard" to be held from 10 to 11:30 a.m. EST Saturday, Feb. 13, 2016 in the Marshall Ballroom East, Marriott Wardman Park.

Provided by Northwestern University

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